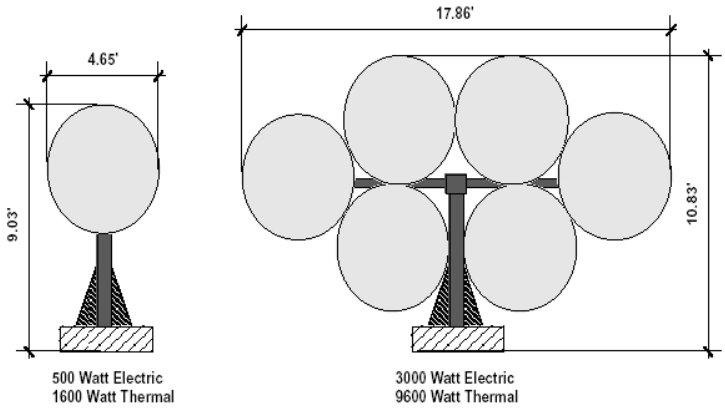
Project Fact Sheet

Hybrid Thermophotovoltaic Power System

GOAL

- To design, develop, fabricate, test and demonstrate a prototype hybrid solar/gas fueled co-generating system for distributed, point-of-use power generation.

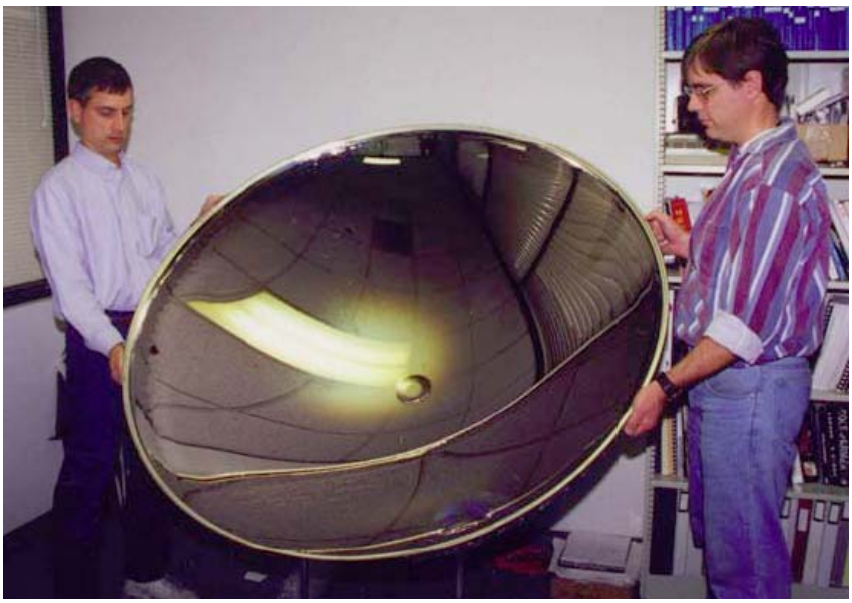


PROJECT DESCRIPTION

The overall objective of this project was to design, develop, fabricate, test and demonstrate a prototype hybrid solar/gas fueled co-generating system for distributed, point-of-use power generation in California and elsewhere. The hybrid generating system is based on the thermophotovoltaic (TPV) conversion process. EDTEK's patented resonant mesh infrared (IR) band-pass filter is the absolute linchpin to TPV spectral control which is essential if high TPV efficiency is to be attained.

BENEFITS TO CALIFORNIA

On-site distributed power can save money for individual, light-industrial, and commercial users in California (potential about $0.035 per kilowatt hour, at the point of use). There is a potential that the establishment of an infra structure for selling, installing, and servicing these new power systems will create many high quality jobs throughout the State of California. Our estimate is that for each 2 mW



installed 20 workers will be employed in high quality jobs. Environmentally, each co-generating solar/gas thermophotovoltaic (SGTPV) unit will displace natural gas consumption when the sun is available. When we combine the solar contribution with the natural gas generation, and consider that the thermal residue also displaces natural gas, the net efficiency (defined as useful energy produced/natural gas burned) is 72.8%. This is about a factor of two higher than that of central power generating stations, which have higher electrical conversion efficiencies but cannot use the solar heat or retrieve and use the thermal residue. Thus, each mW of SGTPV production reduces pollutant emissions by 50% of that produced by the central generation plant.

FUNDING AMOUNT

Commission	$763,508
Match	$1,210,879
Total	$1,974,387

PROJECT STATUS

This project has been completed. During the test and evaluation program, the following functions were demonstrated:

- A complete solar / gas TPV prototype has been designed, developed, fabricated, and tested.
- Heating of the emitter by a gas burner has been demonstrated.
- Production of electricity by gas burner heating has been demonstrated.
- Heating of the emitter by concentrated solar energy has been demonstrated.
- Heating of the emitter by a gas burner and concentrated solar energy simultaneously has been
- demonstrated.
- With the above accomplishments, the feasibility of the hybrid solar/gas TPV concept has been demonstrated.
- Computer control of the air and fuel mixture to the gas burner has been demonstrated.
- The computer-controlled, < 0.1°-accurate sun tracking system has been demonstrated.
- Control of local "house keeping" functions such as night-time stowage has been demonstrated.
- Solar concentration by the EDTEK fabricated parabolic dishes has been demonstrated.
- A commercialization plan for the SGTPV has been compiled.
- A production readiness plan for the SGTPV has been compiled.

FOR MORE INFORMATION

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